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Marine Casualty Investigations

Enquêtes sur les accidents maritimes

Investigation Report to the Minister pursuant to sections 542 or 545 of the Canada Shipping Act

Rapport d'investigation au Ministre conformément aux articles 542 ou 545 de la Loi sur la marine marchande du Canada

Canada

Ce rapport est aussi disponible en français.

REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES OF THE COLLISION BETWEEN THE "EASTERN UNICORN" AND THE "MALOJA II" IN THE BATISCAN CHANNEL, ST. LAWRENCE RIVER, ON JANUARY 13, 1988.

REPORT No. 515

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REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES OF THE COLLISION BETWEEN THE "EASTERN UNICORN" AND THE "MALOJA II" IN THE BATISCAN CHANNEL, ST. LAWRENCE RIVER, ON JANUARY 13, 1988.

Vessel Particulars "EASTERN UNICORN"

Name	"EASTERN UNICORN"
Official Number	14009-84-B
Port of Registry	Panama
Nationality	Panama
Call Sign	3FRE2
Gross Tonnage	15,075
Net Tonnage	4,582
Length (overall)	152.03 m
Breadth	26.3 m
Depth	17.2 m
Draught (at the time of the accident)	F: 6.08 m A: 8.7 m
Type	Roll on/roll off
Built	1979 at Numakuma, Japan
Propulsion	One (1) I.H.I., 16 cylinder diesel engine driving a single-fixed pitch propeller. 10,400 b.h.p.
Speed	17 knots
Bow Thruster	One (1), 480 b.h.p.
Cargo	1,874 tonnes general cargo
Crew	25 including the master plus 2 Canadian pilots
Passenger	None
Classification	Nippon Kaiji Kyokai (N.K.)

Owner	Malcolm Shipping Ltd., Liberia
Agent	Lower St. Lawrence Ocean Agencies Ltd. Québec, Qué.

Navigating Equipment

Radar 1	3 cm Tokyo Keiki 10-1211-1 Range 120 M
Radar 2	3 cm Tokyo Keiki 10-1211-1 Range 120 M
Direction Finder	Koden KS-540
Echo Sounder	Kaijo Denki
Loran C	Koden LR-707
Omega	Koden OR-166
VHF 1	Polaris Regency
VHF 2	Kyoritsu Dempa CU-24
Gyro-Compass	Tokyo Keiki with 5 repeaters
Magnetic Compass	One (1)
Automatic Pilot	Tokyo Keiki/Gylot

Vessel Particulars "MALOJA II"

Name	"MALOJA II"
Official Number	707821
Port of Registry	Limassol
Nationality	Cyprus
Call Sign	C4HX
Gross Tonnage	7,680
Net Tonnage	4,979
Length (overall)	143.8 m

Breadth	18.53 m
Depth	10.15 m
Draught (on arrival at Montreal)	F: 5.05 m A: 6.8 m
Type	Cargo/Container Carrier
Built	1974 at Bardenfleth, Federal Republic of Germany
Propulsion	Two (2) MAN diesel engines, driving a single shaft and a controllable-pitch propeller total 6,700 b.h.p.
Speed	14.5 knots
Bow Thruster	One (1) Kamewa 400 h.p.
Cargo	A full cargo of containers, 4,906 tonnes of which 89 tonnes were dangerous cargo.
Crew	22 including the master plus 2 Canadian pilots
Passenger	None
Classification	Germanischer Lloyd
Owner	Seafree Maritime Ltd., Limassol, Cyprus.
Agent	March Shipping Montréal, Qué

Navigating Equipment

Radar 1	3 cm Decca TM 1226, range 48 m
Radar 2	10 cm Decca RMS 1230, range 48 m
Direction Finder	Plath SFP 705 LNG
Echo Sounder	Atlas Echograph 460
Sat-Nav	Decca DS 4
VHF 1	Sailor RT 142/29

VHF 2	Sailor RT 143
MF	Electromekano
SSB	Electromekano
Gyro Compass	Anshutz, 3 repeaters
Magnetic Compass	One (1)
Automatic Pilot	AEG

Note: Except where otherwise stated, all times in this report are expressed in Eastern Standard Time (UTC-5 hours).

Background

On the morning of January 13, 1988, the Canadian Coast Guard Radio Stations (CCGRS), VFN at Montréal and VCC at Québec received from Environment Canada, for immediate broadcast, a marine warning announcing the passage of an intense line squall between Montréal and Donnacona between 1000 and 1300 EST.

While this marine warning was being broadcast by the CCGRS, the Cypriot vessel "MALOJA II" and the Panamanian vessel "EASTERN UNICORN" were upstream of Québec. The former vessel was upbound for Montréal and the latter was in the Sorel area downbound towards Gros Cacouna, in order to load timber. Both vessels had two Canadian pilots aboard.

Shortly after 1225,the upbound "MALOJA II" and the downbound "EASTERN UNICORN" were in sight of one another and both were on courses to enter the Batiscan channel. Shortly afterwards, weather conditions rapidly deteriorated and the visibility started to become progressively reduced to nil by snowfall accompanied by strong SW'ly winds.

At a time when visibility was nil, both vessels confidently entered the Batiscan channel without either making sound signals or entering into radio communication.

Suddenly about 1232-1233, with no time to manoeuvre to avoid a collision, the upbound "MALOJA II" and the downbound "EASTERN UNICORN" collided violently, 'head on'.

This casualty caused extensive damage to both vessels. Estimates of costs for repairs were in the order of $108,000 for the "EASTERN UNICORN" and $296,000 for the "MALOJA II".

No pollution was caused nor was any member of the crew of either vessel injured.

Narrative

"EASTERN UNICORN"

On the morning of January 13, 1988, the Panamanian vessel "EASTERN UNICORN" was made fast alongside berth B-1 in the Port of Montréal. About 0400, in preparation for sailing, the navigating equipment was tested and found to be in good order. The officer of the watch (OOW) made an entry to this effect in the log book.

On leaving Montréal, the draught was 6.08 m forward and 8.70 m aft, for a mean freeboard of 9.84 m. There were 1,874 tonnes of general cargo aboard.

At about 0630, with two Canadian pilots aboard, the "EASTERN UNICORN" departed the Port of Montreal, downbound for Gros Cacouna to load a cargo of timber.

On January 13, 1988 at about 0930, the vessel was off the Town of Tracy and about 0940 she reported that she was at Calling-in-Point (CIP) No. 21 at Ile-des-Barques before starting to cross Lac St.-Pierre. The downbound voyage was normal and without incident.

During this period, i.e. about 0910, CCGRS VFN at Montréal received a line squall warning from Environment Canada for immediate broadcasting. The passage of this line squall affected the sector between Montréal and Donnacona.

At 0942, as requested by Environment Canada, the operator at CCGRS VFN at Montréal broadcast the following marine warning simultaneously on VHF channels 16, 21, 25 and 83.

> Bulletin
> Attention marine interests
> Squall line (sic) warning for the St. Lawrence River from Montréal to Donnacona issued by Environment Canada in Montreal at 0910 AM EST Wednesday January 13.
>
> For immediate broadcast
> An intense cold front will move across the above area between 1000 AM and 0100 PM (sic) today. Visibilities will be reduced near zero in heavy snowflurries and winds gusting 30 to 40 knots as the front passes. This warning is valid from 1000 to 1300 EST.

During the broadcast of this marine warning by the CCGRS, the "EASTERN UNICORN" was crossing Lac St.-Pierre and about 1017 she reported to Vessel Traffic Services (VTS) at Montréal that she was at Yamachiche (CIP 20). Shortly before this, at 0947, the Montréal VTS marine regulator called the "EASTERN UNICORN" and read to her the French text of the marine warning, and the vessel confirmed having received the message.

At 1125, the "EASTERN UNICORN" was downstream of the Laviolette bridge in the Port of Trois-Rivières in the area off berth No. 10, where a change of pilots took place. The two pilots from the Montréal, Trois-Rivières sector were relieved by two other pilots from the Trois-Rivières, Québec sector. At the changeover of pilots, those being relieved did not make any reference to the marine warning in force for the Montréal/Donnacona forecast area to the two pilots who were embarking to pilot the vessel to Québec.

The first pilot arrived on the navigating bridge and undertook the conduct of the vessel for the first hour, after which the conduct of the vessel would be alternated hourly with the second pilot.

As the visibility was excellent, the first pilot, after having obtained particulars of the engines from the master, ordered full speed ahead, i.e. a speed of 15 knots.The engine was running on heavy oil. The master had previously assured the pilot that the engine could be manoeuvred while running on heavy oil, but cautioned that the engine should not be stopped. The engine was set to 95 r.p.m., the engine data logger registered 'full speed ahead' at 1125.5.

On embarking at Trois-Rivières, the first pilot reported to VTS Montréal and informed the regulator that his ETA for Batiscan was 1230. At this time the regulator did not inform him of the marine warning in force until 1300 in the Montréal to Donnacona sector. During this time the second pilot verified the radar situated on the port side of the wheel-house. Using observations of shore marks, he determined that the variable range marker was correct and that the gyro-compass error was negligible.

The weather was cloudy and the visibility excellent. About 1210, the master left the bridge for lunch in the officer's mess. After this, there were present on the bridge the OOW, the helmsman and two pilots.

During this time, between 1200 and 1210, a strong line squall swept across the town of Trois-Rivières which reduced

visibility to nil in squalls of snow and driven snow. An Environment Canada observer on board the Canadian Coast Guard Vessel (CCGV) "NORMAN McLEOD RODGERS", which was made fast to the quay in the Port of Trois-Rivières, observed the anemometer registering a maximum of 58 knots.

At this time the "EASTERN UNICORN" was proceeding towards Batiscan and nobody on board was aware that a line squall would sweep across the Batiscan area within the next 20 minutes.

At about 1224, the "EASTERN UNICORN" reported to VTS Montreal that she was at CIP No. 18 at Batiscan. The VTS regulator informed the vessel of the presence of two upbound vessels between Grondines and Batiscan, the first of which was the Cypriot "MALOJA II" and the second the Canadian vessel "SAUNIERE", and of three other vessels upbound for Grondines. Once again the Montréal VTS regulator did not read the marine warning to the vessel.

The average speed over the ground of the "EASTERN UNICORN", from the time that the pilots had embarked until Batiscan, was about 17 knots.

As it was almost time for the second pilot to relieve the first at the conduct of the vessel, he went to the washroom. As he wished to see out, he scraped the ice frozen on the washroom window overlooking the vessel's stern. It was at this time that he saw a large mass of grey clouds which seemed to be moving on the north shore. He returned to the wheel-house, and being intrigued by the presence of the cloud mass, he glanced through the window in the port wheel-house door. He observed that the cloud mass was becoming blacker and blacker, but that it seemed to be confined to the north shore.

At about 1228, the second pilot relieved the first of the conduct of the vessel. At this time the Les Becquets quay was abeam to starboard and the vessel's course was 045°(G). In order to negotiate the Batiscan channel curve, course was altered to 053°(G).

The visibility was still good and the second pilot could easily see as far as Grondines as well as the two upbound vessels in the area of Cap Lévrard.

As the pilot was still uneasy about the presence of the large mass of black clouds to the north, and as a safety measure, he ordered the OOW to reduce speed to 12 knots. The officer carried out the order by telephoning to the engineer on watch to reduce revolutions from 95 to 75 r.p.m.

As the course was being altered from 045°(G) to 053°(G), buoys D63 and D59 were still visible. On passing buoy D63, the course was again altered, this time to 059°(G) in order to pass close to buoy D59, which was still visible. Just before arriving at buoy D59 the visibility started to deteriorate. According to a verification by radar, which was on the 1.5 mile range, it was determined that the "EASTERN UNICORN" was 7.5 cables distant from the shore of the bay downstream of Les Becquets. This distance confirmed to the pilot that the vessel was slightly to the south of the centre line of the channel at buoy D59.

The "EASTERN UNICORN" entered the Batiscan Reach, during which time visibility was reduced to almost nil in the snow squalls. Knowing that the current sets to the north in this area, course was altered to 061°(G), the intention being to keep the vessel to the south of the channel centre line. During this time, the other pilot was at the radar on the starboard side. The radar was on the 3-mile range. He observed that the heading marker was directly over the point of Cap Lévrard and that there was an echo slightly to port of the heading marker, at a distance he estimated to be 1.25 mile. He then left his post to go to the forward wheel-house windows, while the OOW was near to the engine controls on the port side of the wheel-house.

The other radar was on the 1.5 mile range and was being watched by the second pilot who had the conduct of the vessel. He observed an echo, forward, at a distance of 2 to 3 cables, slightly to port of the heading marker. He then ordered the helmsman to steer 063°(G) to give a wider berth between his and the upbound vessel. After having ordered this course alteration, the pilot went to the gyro repeater to verify the course steered by the helmsman. On the way there, the OOW, who was at the controls, said something which the pilot did not understand. The pilot looked in his direction and saw the "MALOJA II". Before he had time to react, the vessel collided with the upbound vessel.

Under the shock of the collision, the "EASTERN UNICORN" swung some 20° to starboard. Immediately the pilot ordered the engine stopped, then the helm 'hard-to-port' and finally the engine to 'full astern' with the helm midships. The engine data logger recorded 'stop' at 1231 and 'full speed astern at 1231.5.

From the wheel-house of the "EASTERN UNICORN", the upbound vessel "MALOJA II" was observed to pass rapidly along the port side. The two vessels were held together by the interaction between them, while the "MALOJA II" rolled heavily from one side to the other.

As soon as the two vessels had separated, the pilot called the upbound vessel "SAUNIERE" to warn her of the collision and that the "EASTERN UNICORN" was presently going astern.

The meeting with the second upbound vessel "SAUNIERE" took place downstream of buoy D55 as the "EASTERN UNICORN" was almost immobilized on a heading of 035°(G).

The "EASTERN UNICORN", set by the downstream current and by the strong wind which had veered to the NW and towards the southern edge of the channel, succeeded in getting under way again, about 1253, in the area of buoy D53.

After a damage inspection by the navigating personnel, the "EASTERN UNICORN" got under way downbound towards Québec. She arrived there at about 1745 on January 13, 1988 for inspection by the Canadian Coast Guard.

The Cypriot vessel "MALOJA II"

About 1900 on January 12, 1988 the Cypriot vessel "MALOJA II" arrived off the pilotage station at Les Escoumins, with a cargo of containers from Bilbao, Spain for Montréal. The next morning, i.e. January 13, at about 0812 the vessel was off Québec and the two pilots from the Les Escoumins/Québec sector were relieved and replaced by two other pilots from the Québec/Trois-Rivières sector.

The vessel was loaded with 4,096 tonnes of general cargo in containers, of which 47 containers were stowed on the top of the hatches, at a mean height of 4.9 metres above main deck level. The draught was 5.05 m forward and 6.80 m aft, with a mean freeboard of 4.25 m.

As soon as the pilots embarked at Québec the radars were verified and found to be in a satisfactory state except for the variable range marker which had an error of +.01 mile, i.e. an error of about 60 feet. The two radars were working on relative presentation. A verification of the gyro-compass determined that it had an error of about ½°W.

Leaving the Québec pilotage station, the "MALOJA II" was accompanied by three other vessels which were also upbound towards the Québec bridge. These vessels were; the "NORDSTAR", the "NORDHEIDE" and the Canadian vessel "SAUNIERE". The "MALOJA II" caught up with and overtook these three vessels and, at Grondines, she was the first of the four vessels upbound towards Montréal.

The first pilot had the conduct of the vessel for the

first hour from the time of embarking, following which he alternated with the second pilot.

Because of the difficult ice conditions at the Québec bridge, the ice-breaker "PIERRE RADISSON" escorted the upbound vessels and without experiencing serious difficulty, the four vessels passed under the Québec bridge. Upstream of the bridges the ice conditions gradually improved to a concentration estimated to be about 4/10 cover of drifting floes at the time of the collision.

About 0920 the "MALOJA II" was off Pointe Deschambault, proceeding at 'full speed ahead'. About 1000 she was off Pointe de Saint-Antoine, about 1045 off Pointe au Platon and about 1120, Vielle-Eglise de Lotbiniére was abeam to port.

During this time, the Canadian Coast Guard Radio Station VCC at Québec broadcast a line squall warning at 0935, 1004 and 1112 on VHF channel 16, and advised vessels to listen to the complete text of this marine weather warning on channels 21B and 83B. While these three broadcasts were being made, the "MALOJA II" was en route upstream of Québec and heading for Grondines CIP. The line squall warning on channel 16 broadcast by CCGRS VCC did not appear to attract the attention of the navigation personnel on duty on the navigating bridge of the "MALOJA II". Although the text of this marine weather warning was received by the VTS centre at Québec about 0930, it was not broadcast to any of the vessels in the sector because of the transmission of the warning on channel 16 by the CCGRS VCC at Québec.

At about 1142, the "MALOJA II" was at CIP 17 at Grondines where she reported to VTS Québec. She then changed sector to VTS Montréal on channel 13, where the regulator advised her that there was a vessel downbound for CIP 18 at Batiscan. The regulator did not make any reference to the marine weather warning in force for this sector to the "MALOJA II".

About noon, the "MALOJA II" was on the Sainte-Emmélie reach and just downstream of buoys D29 and D30. She was going full ahead, i.e. at an average speed of 10 knots over the ground since passing Portneuf. At noon, the watch changed and a short time afterwards, the master returned to the navigating bridge, having finished his meal.

Atmospheric conditions were as follows:

- Visibility good
- Barometric pressure 995 mb, falling
- Air temperature +2°C

- Cloudy with sunny periods
- Wind, SSW at 15 knots, continually increasing in force.

Between 1210 and 1215, the first pilot returned to the bridge after his meal and relieved the second pilot of the conduct of the vessel. At this time, the "MALOJA II" was in the area of buoys D41 and D42, on a course of 228°(G) with the Pointe des Grondines leading light visible astern. The second pilot left the navigating bridge and went down to the officers' mess for his meal.

From the bridge a mass of black clouds was observed and because of the wind's direction, SSW, it was deduced that this mass of clouds would not cross the river. On board it was not known that this line of black clouds was the approach of a line squall which was to sweep over the river.

During this time, the downbound vessel "EASTERN UNICORN" was seen for the first time from the navigating bridge of the "MALOJA II". She was in the Batiscan area. About 1225 the "EASTERN UNICORN" was heard to report to VTS Montréal that she was at CIP 18 at Batiscan. As her speed was about 17 knots, she informed the regulator that the "EASTERN UNICORN" would be at CIP 17, Grondines at 1300.

On the bridge of the "MALOJA II" were the pilot, the master, the OOW and a helmsman.

The engine was turning at 'full ahead', at an average speed over the ground of 10 knots. The engine was on bridge control.

The two radars were working on the three mile range. One radar was at the forward end of the wheel-house and the other at the after end, near the chart table.

At buoy D54, i.e. in the area of Cap Lévrard, the northern shore and the leading marks of the Batiscan Reach were no longer visible, but the south shore was. Then the downbound vessel "EASTERN UNICORN", which was estimated to be in the area of buoy D63 about 1.8 mile distant, was lost from sight. As sight of the "EASTERN UNICORN" was lost, the master advised the pilot that she was showing her starboard side. At the same time, the OOW determined that the downbound vessel was turning to starboard as sight was lost of her in snow showers.

The pilot was occupied in piloting the vessel visually as the winter spar-buoys which mark the northern edge of the channel were still visible. He rounded spar buoy D54, on a

course of 235°(G) and having arrived near to spar buoy D56 at a distance off of from 30 to 45 metres, he ordered the helmsman to steer 240°(G) then 241°(G). On course 241°(G), buoy D60 was still visible and fine on the starboard bow but it was then lost from view in the snow. Visibility became nil in a heavy snowfall which was driven by a strong, gusting SSW wind.

Without altering the speed of the engine, without making sound signals and without communicating with the downbound vessel, the "MALOJA II" and the "EASTERN UNICORN" approached one another, to meet in the Batiscan Reach at a combined speed of about 25 knots. A look-out was, however, on the starboard side of the deck, making his way to the forecastle head of the "MALOJA II".

The pilot aboard the "MALOJA II" was confident that the meeting with the "EASTERN UNICORN" would be safe because of the following factors:

- when passing spar buoy D56, buoy D60 was fine to starboard before it was lost to view in the snow;
- the current in the area sets to the north, and
- the wind was blowing from the SSW, i.e. from the port side.

Taking these three factors into account he was confident and certain that he could keep the "MALOJA II" close to the northern limit of the channel and he believed that the other pilot would similarly keep the "EASTERN UNICORN" to the southern side of the channel.

As soon as he lost sight of spar buoy D60 in the snow, he went to the radar at the fore end of the wheel-house and determined that the "MALOJA II" was 7.7 cables from the south shore. Following this, he saw for the first time the echo of the "EASTERN UNICORN" fine to port of the heading marker at a distance of about 2 cables. He therefore ordered the helmsman to steer 242°(G).

Meanwhile, the master was at the radar near the chart table, following the echo of the downbound vessel. He reduced the radar's range from 3 to 1.5 to ½ mile. The echo of the "EASTERN UNICORN" was at 0.5 mile and to port of the heading marker during the last reduction of the radar's range.

Suddenly, the OOW saw the "EASTERN UNICORN" and while he was saying "There she is!" the two vessels collided.

The head-on collision was violent and the "MALOJA II" heeled heavily to starboard. In the officers' mess the table tops were effectively cleared and the other pilot, who was seated at a table at the time of the collision, rushed to the bridge.

As the vessels collided the helmsman was thrown to the deck. On picking himself up he determined that the ship's head was about 260°/270°(G). Engine speed was reduced to 'half-ahead' and the engine data logger recorded this movement at 1233.

The pilot ordered the helm 'hard-a-port' as spar buoy D60 was seen on the port side at a distance of about 40 metres. The helmsman was ordered to steer 235°(G) so as to bring the vessel back into the Batiscan channel.

About 1233, the "SAUNIERE", which was upbound about 1.5 mile astern of the "MALOJA II", was informed of the collision and to prepare to reduce speed.

About 1235, the speed of the "MALOJA II" was again increased to 'full speed ahead' and visibility progressively became good, with a NW wind, in the Les Becquets sector.

After having informed VTS Montreal of the collision about 1239 and while soundings of all tanks and a damage inspection were being carried out, the "MALOJA II" continued on her passage towards Montreal. She arrived at her destination at about 2200 on January 13, 1988.

Analysis

1. Certificates of the vessels involved in the collision

At the time of the collision, all certificates of the vessels "EASTERN UNICORN" and "MALOJA II" were valid.

2. Aids to navigation and instruments on board

On board both vessels involved in the collision, all navigation aids and equipment as well as the VHF radiotelephones were working well.

Each vessel was equipped with an engine data logger, but neither was equipped with a course recorder.

3. Propulsion machinery

The propulsion and other machinery were working well and did not contribute to the collision.

4. Ice conditions

The collision can not be attributed to ice conditions, the concentration of which was estimated by both parties 4/10 of drifting floes.

5. Currents and tides

According to the Canadian Tide and Current Tables low water at Batiscan was predicted for 1144 and high water for 1621 on January 13, 1988. The collision took place approximately 4 hours before high water.

On page 90, part C of the Sailing Directions, Gulf and River St. Lawrence, sixth edition, 1985, there is a diagram which illustrates the combined strength of the general current and the tidal current in the Batiscan sector. According to the diagram there was, in the sector in which the collision took place, an outgoing current of about 2 knots.

In the Batiscan channel this outgoing current runs across the channel, i.e. the set of the current is towards the northern side of the channel.

6. Weather forecasts and observations

The Environment Canada weather forecasts issued at 0300 on January 13, 1988 described the general situation at 01.00 AM and forecast positions by 07.00 PM (sic) EST as follows:

> A cold front in a northeast-southwest line across central Québec will cross over the St. Lawrence river during the day and will lie across western Anticosti Island this evening in the same orientation. Winds are mainly southwesterly 15 to 25 knots and will become northwesterly 25 to 40 knots behind the front...

The forecast for the Montréal to Donnacona sector was as follows:

> Winds southwesterly 15 to 25 knots becoming northwesterly 20 to 30 with a few gusts to near 35 knots late in the morning. Clearing today with a few flurries mostly this morning. Visibilities 6 miles and over except locally near 3 miles in flurries. High zero to 2 then temperatures dropping later on...

The following observations were recorded in the log book of the upbound vessel "MALOJA II" at noon:

Wind	SW force 4 (15 knots)
Air temperature	+2°C
Barometric pressure	995 mbs, falling;

while the downbound vessel "EASTERN UNICORN" recorded the following observations:

Wind	South force 3 (10 knots)
Air temperature	+5°C
Barometric pressure	996 mbs, falling.

7. Forwarding of the line squall warning

On January 13, 1988, Environment Canada sent a line squall warning by telex to the following stations:

- VCC Québec; French version at 0913, English version at 0921,
- VFN Montréal; French version at 0917, English version at 0925,
- the Regional Information Centre, (CRI); French version at 0918, English version at 0926.

The English text of the marine warning read as follows:

> Attention marine interests. Squall line (sic) warning for St. Lawrence River from Montréal to Donnacona, issued by Environment Canada in Montréal at 09.10 AM ENT (sic), Wednesday January 13.
>
> For immediate broadcast. An intense cold front will move across the above area between 10.00 AM and 01.00 PM (sic) today. Visibilities will be reduced near zero in heavy snow flurries and winds gusting to 30 to 40 knots as the front passes. This warning is in effect from 10.00 AM to 01.00 PM (sic).

8. Broadcast of the line squall warning

Radio station VCC Québec broadcast the marine warning of a line squall three times on VHF channel 16 i.e. at 0935, 1034 and 1112, and advised mariners to listen to the safety signal on channels 21B and 83B.

Meantime radio station VFN, Montréal, broadcast the safety signal simultaneously on channels 16, 21B, 25B and 83B.

In addition Coast Guard radio stations VCC and VFN also broadcast this safety signal on 500 kHz, the distress, urgency and security frequency. The message was also broadcast on the radiotelephone frequency of 2182 kHz.

The Coast Guard Regional Information Centre (CRI) received the marine warning (French version) by telex at about 0918 and retransmitted it, by telex, to VTS Québec about 0924, and by facsimile to VTS Montréal, so that the marine warning could be broadcast on the working frequency of each VTS station.

When the marine warning message was received at VTS Montréal, there were at the time, four vessels underway in all the Montréal VTS sectors, i.e. from Grondines to Montreal.

The "FEDERAL HURON" upbound in sector 6, Port of Montréal, was the first vessel to be advised by the Montreal VTS regulator, at about 0945. Others were the tanker "LE BRAVE", upbound and the "EASTERN UNICORN" downbound towards Trois-Rivières, both in sector 5, Cap Michel to Yamachiche. They were advised at about 0946 and 0947 respectively. Lastly, the "CANADIAN EXPLORER", upbound in sector 4, Grondines to Trois Rivières was advised at about 0948. Following this, VTS Montréal did not again broadcast the warning in question which was, however, in force until 1300.

The Québec VTS centre received the line squall warning message by telex for immediate broadcast, but it was not broadcast on the working frequency of sector 3, Île d'Orleans to Grondines, VHF channel 11, as the message warning of the line squall was broadcast on VHF channel 16 by radio station VCC at Québec.

9. Procedures for the broadcast of important meteorological warnings

The publication Radio Aids to Marine Navigation published by the Canadian Coast Guard describes a safety communication as follows:

> The safety signal consists of three repetitions of the word SECURITY transmitted before the general call on the distress frequencies 2182 kHz and

156.8 mHz. If transmission on these frequencies is impossible, any other available frequency on which attention might be attracted shall be used.

The safety signal indicates that the station is about to transmit a message concerning the safety of navigation or giving important meteorological warnings. The safety message should be sent on a working frequency, which is announced at the end of the call.

A station hearing the safety signal shall shift to the working frequency indicated in the call and listen to the safety message until satisfied that it does not concern them.

With respect to the Vessel Traffic Services Centres (VTS), the National Manual of Operations defines a 'safety communication' as follows:

A safety communication involves transmission of an important navigational or important meteorological warning.

According to the manual, the transmission is made as follows: the word SECURITY is repeated 3 times, followed by a call to "all stations" and then the message. The whole is transmitted on VTS working frequencies.

In the present case, the call was made by CCGRS VFN Montréal and VCC Québec, on 156.8 mHz VHF Channel 16, and the message was read on frequencies 161.65 mHz channel 21B, 161.775 mHz channel 83B, and 161.85 mHz channel 25B, as prescribed in the manuals of telecommunication and procedures.

The VTS Regional Manual of Operations considers an important meteorological warning to be a "Notice to Navigation" and not a safety communication (SECURITY). However the Manual of Operations describes how a 'Notice to navigation' must be dealt with by a VTS Centre:

Even though 'Notices to Navigation' are continuously broadcast by Canadian Coast Guard Radio Stations:

1. The regulator on duty must inform the vessels of the notices in his sector, be it between two reporting points or on leaving a berth; e.g.: meteorological conditions.

(Source: VTS Operations Manual,Québec.)

10. Vessels which weathered the line squall

On January 13, 1988, the line squall warning was in force for the period between 1000 and 1300 in the marine forecast area Montréal to Donnacona. During this period, marine traffic in the sector was as follows:

- one (1) downbound vessel the "EASTERN UNICORN";
- six (6) upbound vessels i.e. the "CANADIAN EXPLORER" "MALOJA II", "SAUNIERE", "NORDSTAR II", "NORDHEIDE" and "L'ORME No. 1".

The first vessel to have been struck by the squall appears to have been the upbound vessel "CANADIAN EXPLORER" which passed the downbound vessel "EASTERN UNICORN" near Champlain, when about 1155 a casual conversation took place on channel 13, the working frequency of VTS Montréal for sector 4. The calling and called stations did not identify themselves, however the conversation appears to have taken place between the upbound "CANADIAN EXPLORER" and the downbound "EASTERN UNICORN" in the Champlain area.

As the "CANADIAN EXPLORER" was upbound and just downstream of Trois-Rivières, she would have been the first to pass through the line squall, which about noon swept over the town of Trois-Rivières on a trajectory of 120-130 degrees at an estimated speed of 40 to 50 knots.

During this period, VTS Montréal received no report concerning any marked change in meteorological conditions or of reduction in visibility from any vessel. However, at about 1231, the time of the collision between the "EASTERN UNICORN" and the "MALOJA II", a radio call, once again unidentified but which appears to have come from the upbound vessel "CANADIAN EXPLORER", asked on channel 13: "..., are you in the blizzard?". The calling station did not receive a reply but it appears that this call was directed to the downbound vessel "EASTERN UNICORN".

According to radiotelephone calling procedures, a calling station and the station called must be identified.

Furthermore, the VHF Radiotelephone Practices and Procedures Regulations, under the heading 'Navigation Safety Call', section 9, states in part:

> ... every ship ... that is maintaining a listening watch pursuant to section 8 shall make a navigation safety call on the frequency on which it is maintaining the listening watch.

(f) when the ship is approaching in restricted visibility,

(i) a charted route, including a ferry route, or
(ii) a concentration of vessels.

(k) at any other time when a navigation safety call may contribute to the safe navigation of the ship or any other ship.

According to the position of the upbound vessel "CANADIAN EXPLORER" about 1155, she would have been the first vessel to pass through the line squall, and a navigation safety call from her, sent on channel 13, would surely have warned the other upbound vessels in the sector, as well as the downbound vessel "EASTERN UNICORN".

The anonymous call made on channel 13 ".... are you in the blizzard?" about 1231, did not conform with radiotelephone calling procedures and could not alert the other vessels in the sector to an imminent danger.

11. Characteristics of the line squall

The line squall, which swept through the Montreal/Donnacona sector on January 13, 1988 was described by Environment Canada as follows:

Width

According to Villeroy radar charts, the width of the line squall in the Batiscan area was from 10 to 12 miles (20 to 25 km). Each concentric circle on the radar chart is 40 km apart.

Speed

Again according to the Villeroy radar charts, the line squall passed through the Batiscan sector in about 15 minutes; therefore crossing over the sector at a speed of 40 to 50 knots.

Winds

Ahead of the line squall, winds were generally South to South-west at 10 to 20 knots but increasing very quickly to 20 to 30 knots with stronger gusts about 1½ hours before the passage of the line squall. During the last few minutes, winds were from the South-west at 30-40 knots with gusts.

On the squall line, winds attained 54 knots at Saint-Hubert and according to an eye witness, 58 knots in the Port of Trois-Rivières. Similar conditions should have been produced in the Batiscan region.

Behind the line squall, winds veered to the West and blew at 20 to 30 knots, except for some stronger gusting right behind the line.

Trajectory

The squall moved towards the ESE/SE (120-130 degrees).

Duration of the period of zero visibility

At Dorval, visibility was zero for 23 minutes (1617z to 1640z) and for 25 minutes at Sherbrooke (1735z to 1800z). According to eye witnesses, visibility was zero in Trois-Rivières town centre for 5 minutes and for nearly 10 minutes in the Port of Trois-Rivières. If more weight is given to the observations from Trois-Rivières than those made further away at Montréal and Sherbrooke, it may be reasonably estimated that the period of zero or near zero visibility at Batiscan was from 5 to 15 minutes.

Summary of the situation and conclusions

Radar charts show that the line squall passed over the Batiscan sector with the same intensity as when it was over Trois-Rivières a few minutes previously and that it started to strongly influence this sector about 1220 EST. Although the intensity of the precipitation detected by the radar appeared to be the same, the width of the squall appeared to be greater. The documentary evidence consulted and more especially the witness reports in the Trois-Rivières area permit the formulation of a probable scenario of the meteorological conditions which were produced in the area around Batiscan.

A little before 1220 EST, upon the approach of the line

squall, the South-west winds of 20 to 30 knots increased to 30 to 40 knots with gusts to 45 or even 55 knots. After 10 to 20 minutes, the wind veered to the west and reduced to 20 to 30 knots. Concurrent with the maximum gusts, visibility was reduced to zero or near zero. Therefore the period of poor visibility could have lasted from 5 to 15 minutes, and the period of strong winds, which encompasses the period of poor visibility, could have lasted up to about 20 minutes.

12. The installation and use of VHF radiotelephones

The collision took place in a Vessel Traffic Services zone and both vessels were equipped with 2 VHF sets on their navigating bridges. Each vessel had one set on channel 16 and the other set on channel 13, the working frequency for Vessel Traffic Services, zone 4.

In this case, two important facts concerning the use of the VHF radios aboard both vessels involved are noted:

- the VHF radio was not used before the collision happened, to reach an agreement on a meeting situation between the two vessels in the narrow channel;

- for reasons which remain obscure, neither vessel heard the "SECURITY" call concerning the line squall warning on channel 16.

Monitoring of the recording of radio conversations confirms the fact that no VHF radio communication took place before the collision between the downbound vessel "EASTERN UNICORN" and the upbound vessel "MALOJA II".

The monitoring of these radio conversations also confirms the fact that the 'SECURITY' call concerning the line squall warning was indeed broadcast on channel 16 by the coastal radio stations. However it was broadcast by VTS Montréal between 0945 and 0948 only and it was not broadcast on the working frequency of VTS Québec.

If the 'SECURITY' call on channel 16 was really not heard on the bridge of the two vessels involved, there are two alternative explanations; the volume controls of the sets were at a low setting or were switched off; or, the navigating personnel didn't pay any attention to the 'SECURITY' call.

13. Radio stations VHF, VFN and VCC; area of coverage

In theory the VHF area of coverage of VCC Québec radio station finishes at Grondines; the area to the west of this is covered by the radio station VFN at Montréal. In practice both areas overlap at Grondines and go beyond the theoretical limit of the two areas, i.e. those of VCC-Québec and VFN - Montréal.

14. The narrow channel and buoyage

The collision took place about half way along the Batiscan Reach. In this area the channel centre-line is aligned in a direction of 240.5° (T) and is 224 m wide over the distance of 1.15 M between buoys D53 and D59.

As it was the winter season at the time of the collision, this part of the channel was marked by winter spar buoys with the exception of retained summer buoys D57 and D58.

15. Soundings of the Batiscan reach following the collision

As the vessel "MALOJA II" had lost a roller fairlead during the collision with the "EASTERN UNICORN" in the Batiscan reach, the Marine Casualty Investigations Division asked Aids and Waterways to sound the sector in order to be certain that there was no obstruction in the sector.

As a result, the CCGV "NICOLET" sounded the entire sector on April 20 and 21, 1988, and no obstruction was found at a depth of less than 10.7 m above chart datum. An analysis of the sounding plan did not reveal any metallic object which could have been lost overboard by the "MALOJA II".

16. Details of the collision, "EASTERN UNICORN"

Navigating personnel on the bridge at the time of the collision

At the time of the collision, there were present on the navigation bridge, two pilots, an officer of the watch and a helmsman.

The vessel's speed

From the time that the pilots embarked in the Port of Trois-Rivières up to the time of the collision, the average speed over the ground of the "EASTERN UNICORN"

had been about 17 knots. However abeam of buoy D63, i.e. about one mile from the position of the collision, engine speed was reduced from 95 to 75 r.p.m.. This reduction in speed took place as soon as the second pilot replaced the first about 1228, i.e. about 4 minutes before the collision.

The conditions of visibility and the position of the "EASTERN UNICORN"

The visibility started to deteriorate a little upstream of buoy D59 and became zero afterwards. At buoy D59, the radar distance from the shore of the bottom of the bay downstream of Les Becquets was 7.5 cables when the course was altered to 059°(G). Visibility was zero when the course was altered from 059° to 061°(G).

Observations of the radar echo of "MALOJA II"

The first pilot, who had been replaced at the conduct of the vessel by the second pilot at about 1228, observed the echo of the upbound vessel "MALOJA II" for the last time at an estimated distance of between 1 and 1.25 cables.

At that time the echo was fine to port of the heading marker which was directly over Cap Lévrard. He then left the radar to go to the forward window, during which time the visibility was zero.

The second pilot, had the conduct of the vessel, observed the echo of the "MALOJA II" on the radar screen at a distance of between two and three cables. It was at this time that he ordered the helmsman to steer 063°(G); he then left the radar screen without surveillance to go to the gyro-repeater to check the vessel's heading. It was at that moment that the collision took place i.e. about 1232 and about four minutes after he had relieved the first pilot.

With regard to the OOW, he took a position by radar which was on the three mile range about 1230 but he did not see the echo of the upbound vessel "MALOJA II".

The Data Logger

The engine data logger indicated full speed ahead at 1125.5, engine stopped at 1231 and full speed astern at 1231.5. It was, however, reported that a reduction in speed was made from 95 to 75 r.p.m. before the collision. This speed reduction, if it took place, is not

indicated by the engine data logger. Further there are contradictory accounts of just when this reduction in speed took place. the OOW asserts that the reduction in speed took place about 10 minutes before the collision and that he, himself, telephoned to the engineer on watch to ask him to reduce revolutions to 75.

With regard to the pilot, he asked for this reduction in speed after having taken over the conduct of the vessel about 1228 i.e., about 4 minutes before the collision.

Inconsistencies as to the position of the collision

The position of the collision was marked on chart No. 1235 near to the southern channel limit. The OOW took the position almost immediately after the collision. However, between the position of 1230 and that of 1233 which the OOW reportedly took, the "EASTERN UNICORN" would have run a distance of only 4 cables i.e. a speed of 8 knots.

However, the OOW took regular positions and his positions seem to confirm a speed over the ground of 17 knots from noon up to the position of 1226 and of 16.5 knots from noon until the position of 1230. This reduction of speed was due to the decrease in r.p.m. from 95 to 75 ordered by the pilot in the area of the Les Becquets wharf. The collision position at 1233, as indicated on the chart, could be in error because of the speed of 8 knots between the positions of 1230 and 1233. At 75 r.p.m., the "EASTERN UNICORN" is normally capable of making a speed of about 12 knots.

As for the pilots, there is also disagreement as to the question of the position of the collision. According to one of them, the collision took place near the channel centre-line but on the South side. That this was so was based upon the last radar observation. The heading marker pointed directly to Cape Lévrard. It seemed to the other pilot that the collision occurred about halfway between the channel centre-line and the southern limit of the channel.

17. Details of the collision "MALOJA II"

Navigating personnel on the bridge at the time of the collision

On the navigating bridge of the "MALOJA II" there were, the master, the pilot, the OOW and a helmsman. The other sailor was on the starboard side of the main deck

on his way to the forecastle to act as a look-out.

Speed of the vessel "MALOJA II"

At the time of the collision, the engines were turning at full speed ahead, i.e. an average speed over the ground of 10 knots.

The conditions of visibility and position of the vessel "MALOJA II"

Visibility started to deteriorate for the "MALOJA II" in the area of Cap Lévrard, around buoy D54. At that time the Northern Shore as well as the Batiscan Reach range lights were not visible any more but the South shore was. The downbound vessel "EASTERN UNICORN" which was in the Batiscan Reach curve could still be seen. It was estimated that she was at buoy D63 when she was lost to view in the snow showers, a distance of about 1.8 miles.

Observations of the radar echo of the "EASTERN UNICORN"

As long as the winter spar buoys marking the northern limit of the channel were visible, the pilot piloted the "MALOJA II" visually with the aid of these buoys. He estimated that he rounded buoy D54 on a course of 235°(G) and, once abeam of this buoy at a distance of 30 to 45 metres, he ordered the course 240°(G) followed by 241°(G). On the course of 241°(G), buoy D60 remained visible and fine on the starboard bow until he lost sight of it in the snow. It was at this time that he went to the radar set to verify the distance from the south shore. The vessel was at 7.7 cables from the south shore. It was then that the echo of the "EASTERN UNICORN" was seen on the radar screen, fine to port of the headway marker, at a distance of about 2 cables. Following this observation, he ordered the course altered to 242°(G).

Losing sight of the downbound vessel "EASTERN UNICORN", the master hurried to the radar set near the chart table. The echo of the "EASTERN UNICORN" was to port of the heading marker, and at a distance of from 1.2 to 1.3 miles. The radar's range was reduced from 3 to 1.5 miles then to the half-mile range. The echo of the "EASTERN UNICORN" remained fine to port of the heading marker until the moment of the collision. At no time was the master in disagreement with the way the pilot was piloting his vessel in the short period of reduced visibility before the collision.

The Data Logger

The engine date logger of the "MALOJA II" indicated full speed ahead at 0917 and half ahead at 1233, being the time of the collision.

Position of the collision

At the time of the collision, the master who was at the radar took two distances using the variable range-marker. The first was 7.9 cables from the south shore and the other was 1.3 mile from Les Becquets point. The position thus obtained indicated that the collision took place in the position of summer buoy D58, i.e. at the northern limit of the channel.

After the collision, spar buoy D60 was observed from the bridge to be on the port side at an estimated distance of 40 m.

18. The courses

Although both vessels were not equipped with a course recorder at the time of the collision, the "EASTERN UNICORN" was steering a course of 063°(G) approximately while the upbound vessel "MALOJA II" was steering a course of approximately 244°(G).

19. Angle of impact

At the time of the collision both vessels were approximately on reciprocal courses and they collided head-on.

20. Speed

It would appear that the vessels approached each other at a combined speed of approximately 25 knots.

21. Position of the collision

There was disagreement between the two vessels as to the position of the collision. According to the upbound vessel "MALOJA II" the collision took place in the position of summer buoy D58, while for the downbound vessel "EASTERN UNICORN" the position of the collision was at the southern limit of the channel upstream of the position of summer buoy D57. However it may be noted that the course steered by the downbound vessel "EASTERN UNICORN" before the collision seems to indicate that no allowance was made for the combined effects of the wind and the current which were in a direction towards the

northern side of the channel.

22. The Collision Regulations

The collision took place in a narrow channel and each vessel involved had obligations which are clearly defined in the Regulations for Preventing Collisions at Sea of which the principal rules in this case are:

Rule 5	Look-out
Rule 6	Safe-Speed
Rule 7	Risk of Collision
Rule 8	Action to avoid Collision
Rule 9(k)	Narrow Channel - Canadian Modifications
Rule 34(1)	Underlines that a vessel may use a bridge-to-bridge radiotelephone instead of the whistle signals prescribed by other rules.

In the present case, there was neither communication nor sound signal made nor was any action taken to avoid a collision. As to the look-out prescribed by Rule 5, neither vessel had time to post a look-out due to the rapid change in weather conditions. However Rule 2(b) of the Regulations for Preventing Collisions at Sea reads as follows:

> (b) In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these Rules necessary to avoid danger.

In this case, the sudden passage of the line squall, of which the navigating personnel aboard both vessels seemed to be unaware, would seem to be a special circumstance referred to in Rule 2(b).

Concerning a special circumstance, British Shipping Laws, Volume 4, Marsden, The Law of Collisions at Sea, chapter 24, paragraph 676, under "The Regulations not applied mechanically", the following interpretation is found:

> Even where a position of risk is established, and a particular rule is proved to have been applicable, a vessel will not be held in

> fault for non-compliance with it, if the time during which it was applicable was so short, or the circumstances so startling, that a seaman of ordinary skill, care, and nerve might reasonably be excused for not having appreciated the situation in time to enable him to obey the law.

According to Farwell's Rules of the Nautical Road, Chapter 18 pages 308 to 311, a special circumstance is not necessarily one of extreme complexity. It results from a sudden or immediate change in the conditions of navigation between one, two or several vessels.

In the present case both vessels approached each other in a narrow channel at a combined speed of 25 knots and lost sight of each other suddenly at a distance of about 1.8 miles, i.e. with at most 4 minutes of reaction time.

23. Casualties in the Batiscan Reach

According to Marine Casualty Investigations records, 7 groundings, 2 cases of collision and 1 case of a vessel touching the bottom have been reported in the sector between Cap Lévrard and Batiscan since 1975.

Further, according to the Vessel Movement Register kept by the Regional Information Centre of the Canadian Coast Guard, there were a total of 44,197 vessel movements in the sector where the collision between the "EASTERN UNICORN" and the "MALOJA II" occurred, from 1981 to 1986, inclusive.

24. Dangerous Cargo

At the time of the collision there was aboard the "MALOJA II" some 89 tonnes of dangerous cargo in containers as follows:

- 45 tonnes of IMCO Class 2
- 24 tonnes of IMCO Class 3.3
- 20 tonnes of IMCO Class 6.1

25. Damage to the vessels

In summary, the ship's side plating of the port bow of the "EASTERN UNICORN" was heavily set in and fractured between frames 140 and 165. The ship's side plating was set in and fractured on the port side amidships between frames 55 and 81 below the sheer strake. All damage, the cost of which was estimated to be $108,000, was

limited to above the waterline.

The port side of the vessel "MALOJA II" was also severely damaged. The foc'sle bulwark was demolished with a fracture at deck level. The access ladder to the foc'sle from the main deck was demolished. On the port side of the gantry crane, the base of the electric motor was fractured and the upper part of the gantry crane damaged. The boat deck on the port side was bent back by the impact, the lifeboat destroyed and the inflatable liferaft also damaged. The boat deck after rail was twisted and bent over its whole length. The cost of repairs to the vessel was in the region of $296,000.

Two roller fairleads were lost aboard the "MALOJA II" during the collision with the "EASTERN UNICORN". One of these fairleads was found in the port side shell plating of the downbound vessel "EASTERN UNICORN".

26. Experience and Qualifications

The master of the "EASTERN UNICORN" has been at sea since 1975. He is the holder of a Panamanian certificate of competency as master (foreign-going) and of Korean and Liberian certificates as master (foreign-going). He has been master since 1982 and aboard the "EASTERN UNICORN" since May 1987.

The second officer of the "EASTERN UNICORN" has been at sea for 15 years and is the holder of a Panamanian certificate of competency as first mate. He has been aboard the "EASTERN UNICORN" since April 1987.

The helmsman on duty at the time of the collision is a qualified able-seaman and has been at sea for 10 years of which the last 7 have been as helmsman.

The master of the "MALOJA II" has been at sea since 1955. He is the holder of a German certificate of competency as master (foreign-going) obtained in 1965. He has been sailing as master since 1969 and aboard the "MALOJA II" since November 1987.

The second officer of the "MALOJA II" has been at sea since 1973 and is the holder of a Philippines first mate's certificate obtained in 1983. He has been aboard the "MALOJA II" since November 1987.

The helmsman on duty at the time of the collision is a qualified Able-Seaman and has been at sea since 1974, the last 7 years as helmsman.

The pilot on duty aboard the "EASTERN UNICORN" has 22 years of sea time of which 13 years have been as a pilot. Eight of these 13 years have been as a Class "A" pilot.

The pilot on duty aboard the "MALOJA II" has 31 years as a pilot of which the last 25 years have been as a Class "A" pilot.

Findings

At about 1232 on January 13, 1988, the vessels "EASTERN UNICORN" and "MALOJA II" collided head on in the Batiscan Reach during a short period of strong winds and reduced visibility caused by the passage of a line squall.

It would appear that the following factors contributed to the casualty:

- although there were indications of an area of reduced visibility all around, their significance was not recognized in time by either vessel;

- both vessels entered an area of reduced visibility without significantly reducing their respective speeds;

- a combined speed of 25 knots in a narrow channel, taking into account the weather conditions, left little margin to correct an error in navigation.

The two vessels were in sight of each other up to a distance of about 1.5 miles, after which they lost sight of each other in the line squall:

- those having the conduct of both vessels did not maintain a continuous radar watch, and they did not detect the radar target of the other vessel until they were at a distance of about 2 cables from each other;

- except for a minor change of course by each vessel and a change in the speed of the "EASTERN UNICORN", no other measure was taken to avoid collision by either vessel;

- neither vessel used the VHF radiotelephone to communicate with the other before the collision nor did either vessel make the appropriate sound signals, in restricted visibility; and

- the "EASTERN UNICORN" did not make sufficient allowance for the set and drift caused by the current and wind.

Other Findings

The broadcast of the marine warning made by VTS Québec and VTS Montréal was not made in accordance with their Operations Manual directives.

During the change over of pilots at Trois-Rivières on board the "EASTERN UNICORN", the pilots of the Montréal to Trois-Rivières sector did not inform the pilots of the Trois-Rivières to Québec sector of the marine warning in force.

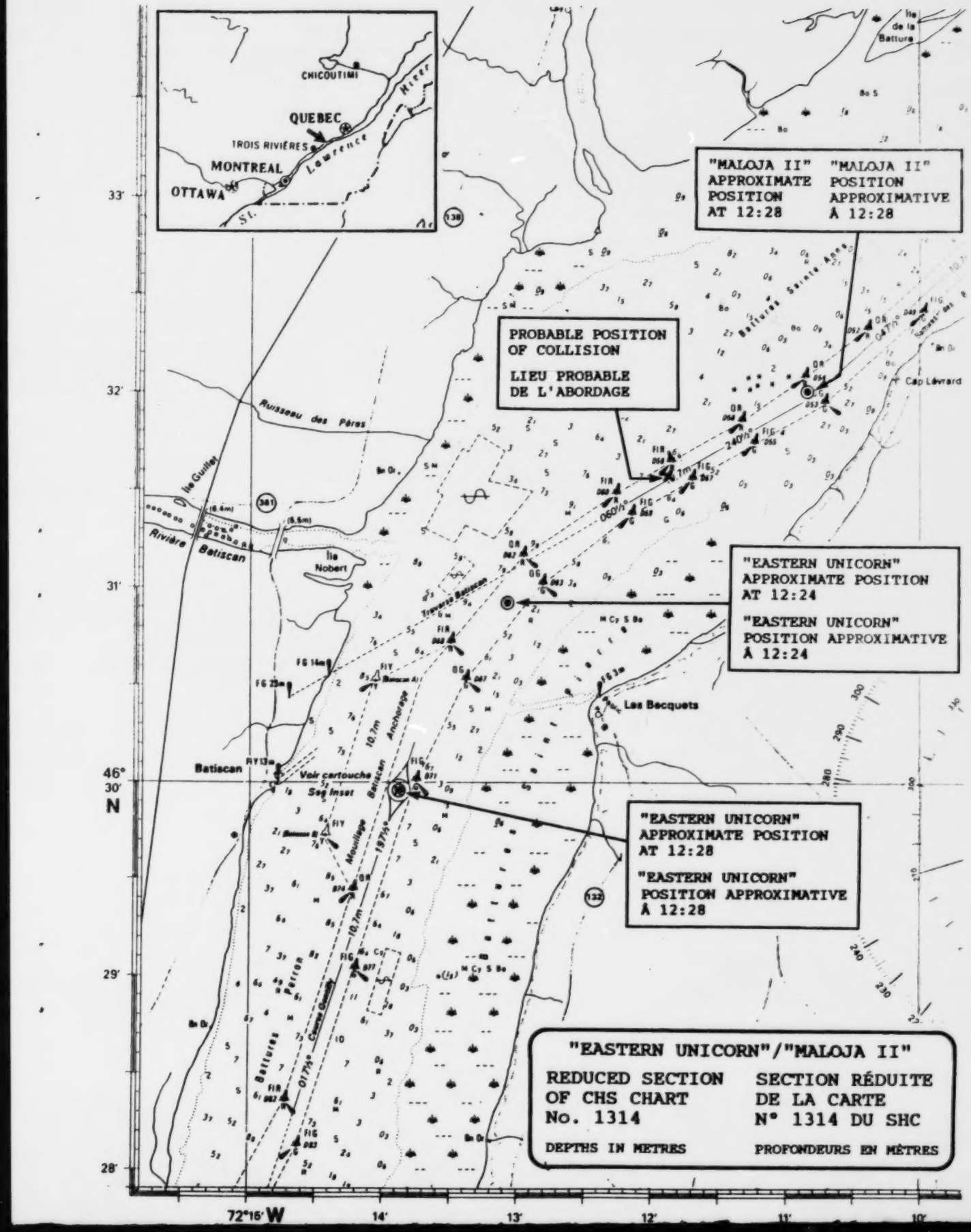
The repeated calls made on VHF channel 16 by VCC Québec concerning a SECURITY message did not attract the attention of the navigating personnel of the "MALOJA II".

Contrary to radiotelephone calling procedures, the calling station, "CANADIAN EXPLORER" did not identify herself during a VHF radio conversation with the downbound vessel "EASTERN UNICORN". The call was made on VHF channel 13, the working frequency of VTS Montréal.

The marine weather warning of a line squall issued by Environment Canada proved to be correct. This warning correctly forecast zero visibilities, the only exception being that the maximum speed of the wind was underestimated by only 10 to 15 knots.

MARINE CASUALTY INVESTIGATIONS
TRANSPORT CANADA
110 O'CONNOR
OTTAWA, ONTARIO
K1A 0N5

JANUARY, 1989.

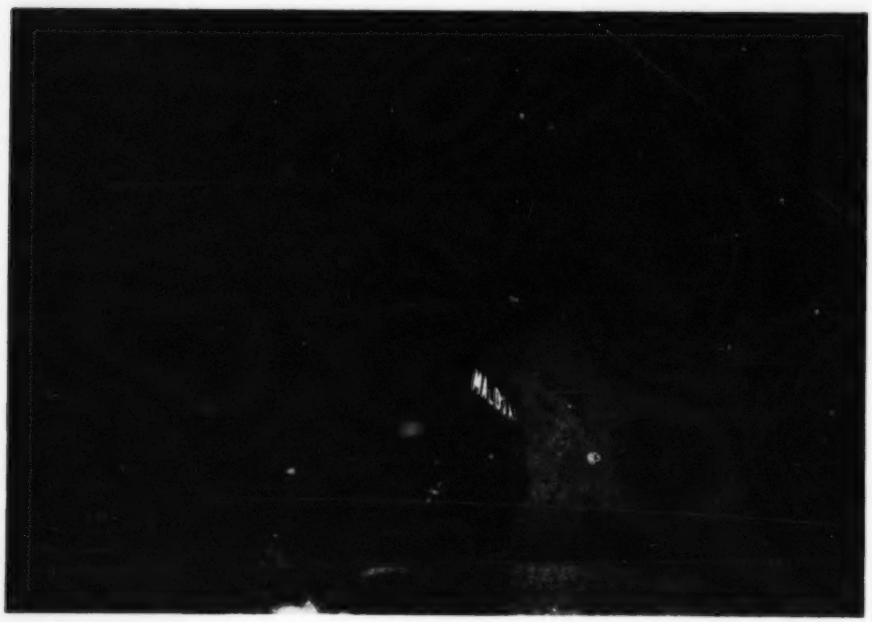

CHICOUTIMI
QUEBEC
TROIS RIVIÈRES
MONTREAL
OTTAWA
St. Lawrence River
"MALOJA II" APPROXIMATE POSITION AT 12:28
"MALOJA II" POSITION APPROXIMATIVE À 12:28
PROBABLE POSITION OF COLLISION
LIEU PROBABLE DE L'ABORDAGE
"EASTERN UNICORN" APPROXIMATE POSITION AT 12:24
"EASTERN UNICORN" POSITION APPROXIMATIVE À 12:24
"EASTERN UNICORN" APPROXIMATE POSITION AT 12:28
"EASTERN UNICORN" POSITION APPROXIMATIVE À 12:28
Batiscan
Voir cartouche Seg Inset
Rivière Batiscan
Ruisseau des Pères
Île Gaillet
Île Nobert
Les Becquets
Cap Lévrard
Batteries Sonars Ames
Mouillage
Ancrage
Batteries
Canal
33'
32'
31'
30'
29'
28'
46° 30' N
72°16' W
14'
13'
12'
11'
10'
"EASTERN UNICORN"/"MALOJA II"
REDUCED SECTION OF CHS CHART No. 1314
SECTION RÉDUITE DE LA CARTE N° 1314 DU SHC
DEPTHS IN METRES
PROFONDEURS EN MÈTRES

Note: Opening in ship's side plating.

Nota: Ouverture dans le bord du navire.

The "EASTERN UNICORN" made fast at Anse au Foulon, Port of Quebec, January 14, 1988.

Le "EASTERN UNICORN" amarré à l'Anse au Foulon, port de Québec, le 14 janvier 1988.

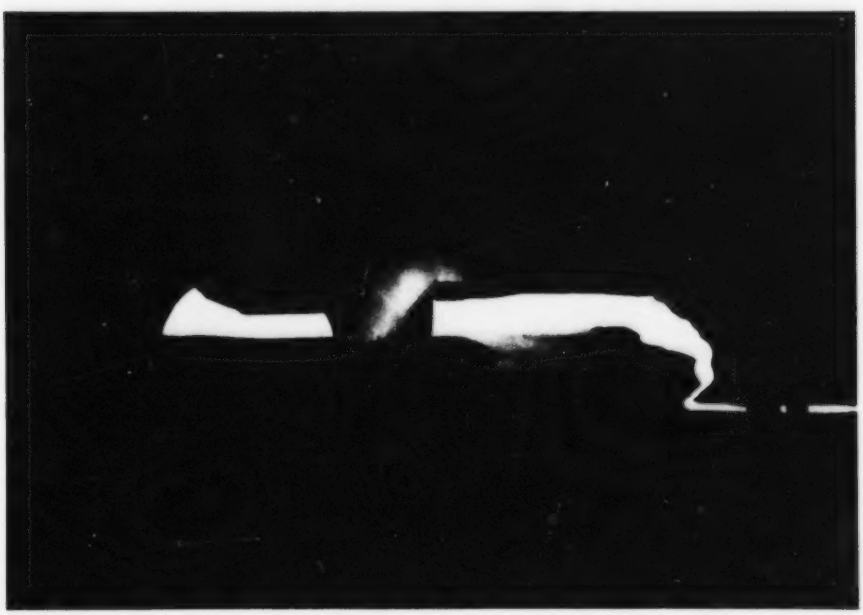


The "MALOJA II" made fast at section 68, Port of Montreal, January 15, 1988.

Le "MALOJA II" amarré dans le port de Montréal, section 68, le 15 janvier 1988.

A roller fairlead from the "MALOJA II" wedged into the ship's port side plating of the "EASTERN UNICORN".

Un chaumard à rouleaux du "MALOJA II" coincé dans dans le bordé bâbord du navire "EASTERN UNICORN".



Inside view of the opening in the port side plating of the "EASTERN UNICORN".

Vue de l'intérieur, ouverture dans le bordé bâbord du "EASTERN UNICORN.

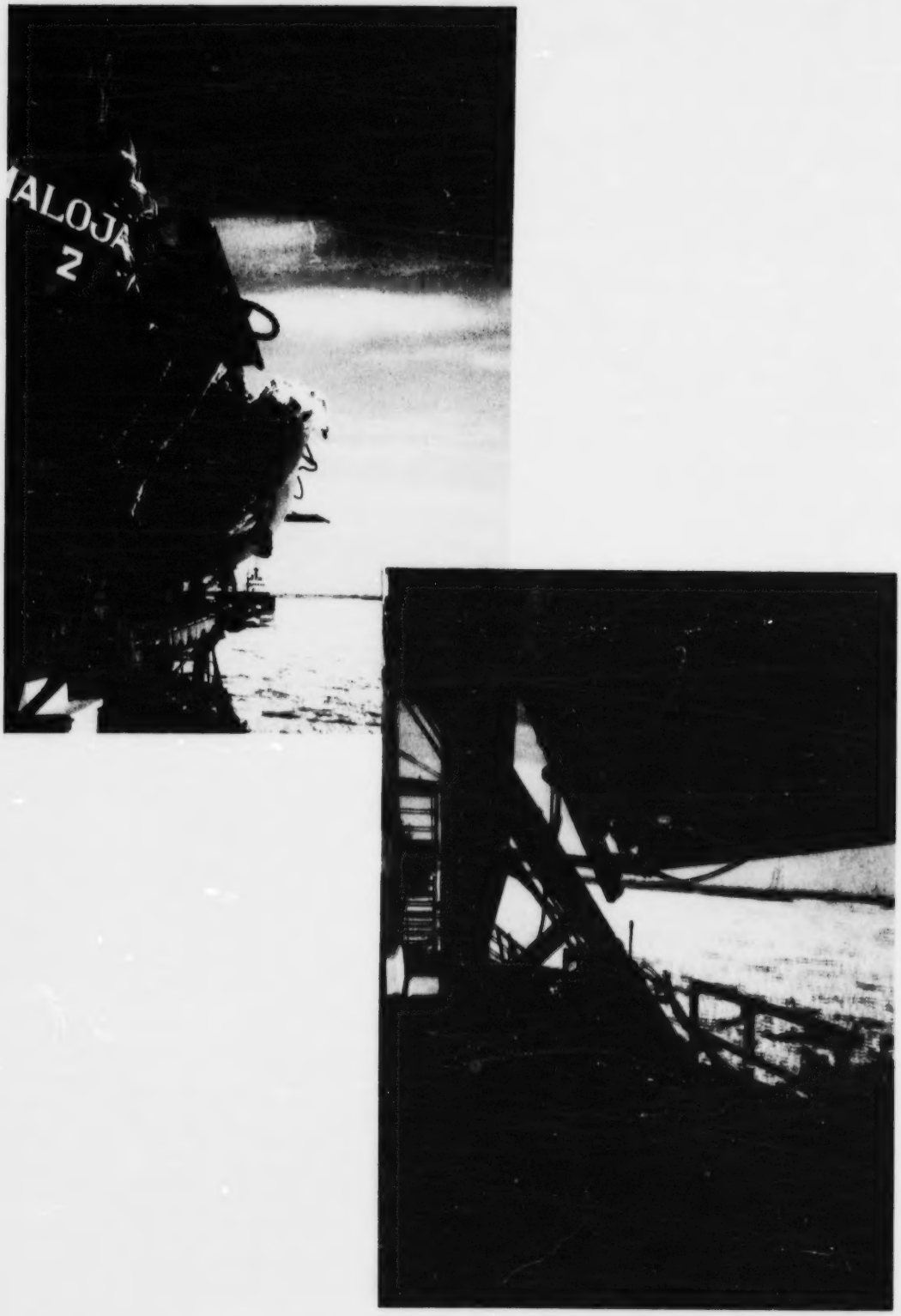
"MALOJA II"

Damage to the port side of the forecastle deck.

Vue des avaries sur le pont gaillard d'avant, côté bâbord.

"MALOJA II"

Damage to the port side of the embarcation deck.
Vue des avaries au pont des embarcations, côté bâbord.



Damage to the port side of the embarcation deck.
Vue des avaries au pont des embarcations, côté bâbord.

"EASTERN UNICORN"

Damage to the main deck bulwark.
Avaries au pavois bâbord, au niveau du pont principal.

"MALOJA II"

Damage to the port side of the forecastle deck.
Vue des avaries sur le pont gaillard d'avant, côté bâbord.

ANNEX I

REGULATIONS FOR THE PREVENTION OF COLLISIONS

Short Title

1. These Regulations may be cited as the *Collision Regulations*.

PART B—STEERING AND SAILING RULES

SECTION I—CONDUCT OF VESSELS IN ANY CONDITION OF VISIBILITY

RULE 4

Application

Rules in this Section apply in any condition of visibility.

RULE 5

Look-out

Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

RULE 6

Safe Speed—International

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

In determining a safe speed the following factors shall be among those taken into account:

(*a*) By all vessels:

(i) the state of visibility,

(ii) the traffic density including concentrations of fishing vessels or any other vessels,

(iii) the manoeuvrability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions,

(iv) at night the presence of background light such as from shore lights or from back scatter of her own lights,

(v) the state of wind, sea and current, and the proximity of navigational hazards,

(vi) the draught in relation to the available depth of water.

APPENDICE I

RÈGLEMENT POUR PRÉVENIR LES ABORDAGES

Titre abrégé

1. Le présent règlement peut être cité sous le titre: *Règlement sur les abordages.*

PARTIE B—RÈGLES DE BARRE ET DE ROUTE

SECTION I—CONDUITE DES NAVIRES DANS TOUTES LES CONDITIONS DE VISIBILITÉ

RÈGLE 4

Champ d'application

Les règles de la présente section s'appliquent dans toutes les conditions de visibilité.

RÈGLE 5

Veille

Tout navire doit en permanence assurer une veille visuelle et auditive appropriée, en utilisant également tous les moyens disponibles qui sont adaptés aux circonstances et conditions existantes, de manière à permettre une pleine appréciation de la situation et du risque d'abordage.

RÈGLE 6

Vitesse de sécurité—International

Tout navire doit maintenir en permanence une vitesse de sécurité telle qu'il puisse prendre des mesures appropriées et efficaces pour éviter un abordage et pour s'arrêter sur une distance adaptée aux circonstances et conditions existantes.

Les facteurs suivants doivent notamment être pris en considération pour déterminer la vitesse de sécurité:

a) Par tous les navires:

(i) la visibilité;

(ii) la densité du trafic et notamment les concentrations de navires de pêche ou de tous autres navires;

(iii) la capacité de manœuvre du navire et plus particulièrement sa distance d'arrêt et ses qualités de giration dans les conditions existantes;

(iv) de nuit, la présence d'un arrière-plan lumineux tel que celui créé par des feux côtiers ou une diffusion de la lumière des propres feux du navire;

(v) l'état du vent, de la mer et des courants et la proximité de risques pour la navigation;

(vi) le tirant d'eau en fonction de la profondeur d'eau disponible.

(*b*) Additionally, by vessels with operational radar:

(i) the characteristics, efficiency and limitations of the radar equipment,

(ii) any constraints imposed by the radar range scale in use,

(iii) the effect on radar detection of the sea state, weather and other sources of interference,

(iv) the possibility that small vessels, ice and other floating objects may not be detected by radar at an adequate range,

(v) the number, location and movement of vessels detected by radar,

(vi) the more exact assessment of the visibility that may be possible when radar is used to determine the range of vessels or other objects in the vicinity.

Safe Speed—Canadian Modifications

(*c*) In the Canadian waters of a roadstead, harbour, river, lake or inland waterway, every vessel passing another vessel or work that includes a dredge, tow, grounded vessel or wreck shall proceed with caution at a speed that will not adversely affect the vessel or work being passed, and shall take into consideration applicable information contained in any Notice to Mariners or Notice to Shipping.

(*d*) For the purpose of paragraph (*c*), where it cannot be determined with certainty that a passing vessel will not adversely affect another vessel or work described in that paragraph, the passing vessel shall proceed with caution at the minimum speed at which she can be kept on her course.

(*e*) In the Canadian waters of a roadstead, harbour, river, lake or inland waterway, where abnormal water levels, ice conditions or a casualty to a vessel or aid to navigation may

(i) make navigation difficult or hazardous,

(ii) cause damage to property, or

(iii) block the navigational channel,

every vessel shall navigate with caution and shall take into consideration the applicable information contained in any Notice to Mariners or Notice to Shipping with respect to speed, routing and anchorage.

b) De plus, par les navires qui utilisent un radar:

(i) les caractéristiques, l'efficacité et les limites d'utilisation de l'équipement radar;

(ii) les limitations qui résultent de l'échelle de portée utilisée sur le radar;

(iii) l'effet de l'état de la mer, des conditions météorologiques et d'autres sources de brouillage sur la détection au radar;

(iv) le fait que les petits bâtiments, les glaces et d'autres objets flottants peuvent ne pas être décelés par le radar à une distance suffisante;

(v) le nombre, la position et le mouvement des navires détectés par le radar;

(vi) le fait qu'il est possible d'apprécier plus exactement la visibilité lorsque le radar est utilisé pour déterminer la distance des navires et des autres objets situés dans les parages.

Vitesse de sécurité – Modifications canadiennes

c) Dans les eaux canadiennes d'une rade, d'un port, d'un cours d'eau, d'un lac ou d'une voie navigable intérieure, tout navire qui dépasse un autre navire ou un ouvrage, notamment une drague, un train de remorque, un navire échoué ou une épave, doit passer prudemment à une vitesse qui n'aura pas d'effet néfaste sur le navire ou l'ouvrage dépassé et il doit tenir compte des renseignements applicables contenus dans un Avis aux navigateurs ou un Avis à la navigation.

d) Lorsque, aux fins de l'alinéa *c*), il est impossible de déterminer avec certitude que le passage d'un navire n'aura pas d'effet néfaste sur un autre navire ou sur un ouvrage décrit audit alinéa, le navire passant doit avancer prudemment à la vitesse minimale nécessaire pour le maintenir sur sa route.

e) Dans les eaux canadiennes d'une rade, d'un port, d'un cours d'eau, d'un lac ou d'une voie navigable intérieure, tout navire doit naviguer prudemment et tenir compte des renseignements applicables contenus dans un Avis aux navigateurs ou un Avis à la navigation relativement à la vitesse, à l'organisation du trafic et au mouillage, lorsqu'un niveau d'eau ou un état des glaces anormaux ou un sinistre subi par un navire ou par une aide à la navigation peuvent

(i) rendre la navigation difficile ou dangereuse;

(ii) endommager des biens; ou

(iii) bloquer le chenal servant à la navigation.

RULE 7

Risk of Collision

(*a*) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.

(*b*) Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

(*c*) Assumptions shall not be made on the basis of scanty information, especially scanty radar information.

(*d*) In determining if risk of collision exists the following considerations shall be among those taken into account:

(i) such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change,

(ii) such risk may sometimes exist even when an appreciable bearing change is evident, particularly when approaching a very large vessel or a tow or when approaching a vessel at close range.

RULE 8

Action to avoid Collision

(*a*) Any action taken to avoid collision shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.

(*b*) Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.

(*c*) If there is sufficient sea room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in good time, is substantial and does not result in another close-quarters situation.

(*d*) Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear.

(*e*) If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.

RÈGLE 7

Risque d'abordage

a) Tout navire doit utiliser tous les moyens disponibles qui sont adaptés aux circonstances et conditions existantes pour déterminer s'il existe un risque d'abordage. S'il y a doute quant au risque d'abordage, on doit considérer que ce risque existe.

b) S'il y a à bord un équipement radar en état de marche, on doit l'utiliser de façon appropriée en recourant, en particulier, au balayage à longue portée afin de déceler à l'avance un risque d'abordage, ainsi qu'au «plotting» radar ou à toute autre observation systématique équivalente des objets détectés.

c) On doit éviter de tirer des conclusions de renseignements insuffisants, notamment de renseignements radar insuffisants.

d) L'évaluation d'un risque d'abordage doit notamment tenir compte des considérations suivantes:

(i) il y a risque d'abordage si le relèvement au compas d'un navire qui s'approche ne change pas de manière appréciable;

(ii) un tel risque peut parfois exister même si l'on observe une variation appréciable du relèvement, particulièrement lorsque l'on s'approche d'un très grand navire, d'un train de remorque ou d'un navire qui est à courte distance.

RÈGLE 8

Manœuvre pour éviter les abordages

a) Toute manœuvre entreprise pour éviter un abordage doit, si les circonstances le permettent être exécutée franchement, largement à temps et conformément aux bons usages maritimes.

b) Tout changement de cap ou de vitesse, ou des deux à la fois, visant à éviter un abordage doit, si les circonstances le permettent, être assez important pour être immédiatement perçu par tout navire qui l'observe visuellement ou au radar; une succession de changements peu importants de cap ou de vitesse, ou des deux à la fois, est à éviter.

c) Si le navire a suffisamment de place, le changement de cap à lui seul peut être la manœuvre la plus efficace pour éviter de se trouver en situation très rapprochée à condition que cette manœuvre soit faite largement à temps, qu'elle soit franche et qu'elle n'aboutisse pas à une autre situation très rapprochée.

d) Les manœuvres effectuées pour éviter l'abordage avec un autre navire doivent être telles qu'elles permettent de passer à une distance suffisante. L'efficacité des manœuvres doit être attentivement contrôlée jusqu'à ce que l'autre navire soit définitivement paré et clair.

e) Si cela est nécessaire pour éviter un abordage ou pour laisser plus de temps pour apprécier la situation, un navire doit réduire sa vitesse ou casser son erre en arrêtant son appareil propulsif ou en battant en arrière au moyen de cet appareil.

RULE 9

Narrow Channels—International

(*a*) A vessel proceeding along the course of a narrow channel or fairway shall keep as near to the outer limit of the channel or fairway which lies on her starboard side as is safe and practicable.

(*b*) A vessel of less than 20 metres in length or a sailing vessel shall not impede the passage of a vessel which can safely navigate only within a narrow channel or fairway.

(*c*) A vessel engaged in fishing shall not impede the passage of any other vessel navigating within a narrow channel or fairway.

(*d*) A vessel shall not cross a narrow channel or fairway if such crossing impedes the passage of a vessel which can safely navigate only within such channel or fairway. The latter vessel may use the sound signal prescribed in Rule 34(*d*) if in doubt as to the intention of the crossing vessel.

(*e*) (i) In a narrow channel or fairway when overtaking can take place only if the vessel to be overtaken has to take action to permit safe passing, the vessel intending to overtake shall indicate her intention by sounding the appropriate signal prescribed in Rule 34(*c*)(i). The vessel to be overtaken shall, if in agreement, sound the appropriate signal prescribed in Rule 34(*c*)(ii) and take steps to permit safe passing. If in doubt she may sound the signals prescribed in Rule 34(*d*).

(ii) This Rule does not relieve the overtaking vessel of her obligation under Rule 13.

(*f*) A vessel nearing a bend or an area of a narrow channel or fairway where other vessels may be obscured by an intervening obstruction shall navigate with particular alertness and caution and shall sound the appropriate signal prescribed in Rule 34(*e*).

(*g*) Any vessel shall, if the circumstances of the case admit, avoid anchoring in a narrow channel.

Narrow Channels—Canadian Modifications

(*h*) Notwithstanding paragraph (*d*), in the waters of the Great Lakes Basin, a vessel that can safely navigate only within a narrow channel or fairway shall, if a crossing vessel impedes her passage, use the sound signal prescribed in Rule 34(*d*) if in doubt as to the intention of the crossing vessel.

(*i*) Notwithstanding paragraph (*e*), in a narrow channel or fairway in the waters of the Great Lakes Basin, a vessel shall indicate its intention to overtake, or its agreement to being overtaken, as the case may be, by sounding the whistle signals prescribed in Rule 34(*j*).

(*j*) In the Canadian waters of a narrow channel or fairway a barge or an inconspicuous, partly submerged vessel or object shall not be navigated, moored or anchored so as to impede the safe passage of any other vessel or object using those waters.

RÈGLE 9

Chenaux étroits—International

a) Les navires faisant route dans un chenal étroit ou une voie d'accès doivent, lorsque cela peut se faire sans danger, naviguer aussi près que possible de la limite extérieure droite du chenal ou de la voie d'accès.

b) Les navires de longueur inférieure à 20 mètres et les navires à voile ne doivent pas gêner le passage des navires qui ne peuvent naviguer en toute sécurité qu'à l'intérieur d'un chenal étroit ou d'une voie d'accès.

c) Les navires en train de pêcher ne doivent pas gêner le passage des autres navires naviguant à l'intérieur d'un chenal étroit ou d'une voie d'accès.

d) Un navire ne doit pas traverser un chenal étroit ou une voie d'accès si, ce faisant, il gêne le passage des navires qui ne peuvent naviguer en toute sécurité qu'à l'intérieur de ce chenal ou de cette voie d'accès; ces derniers navires peuvent utiliser le signal sonore prescrit par la règle 34*d*) s'ils doutent des intentions du navire qui traverse le chenal ou la voie d'accès.

e) (i) Dans un chenal étroit ou une voie d'accès, lorsqu'un dépassement ne peut s'effectuer que si le navire rattrapé manœuvre pour permettre à l'autre navire de le dépasser en toute sécurité, le navire qui a l'intention de dépasser doit faire connaître son intention en émettant le signal sonore approprié prescrit par la règle 34*c*)(i). Le navire rattrapé doit, s'il est d'accord, faire entendre le signal approprié prescrit par la règle 34*c*)(ii) et manœuvrer de manière à permettre un dépassement en toute sécurité. S'il est dans le doute, il peut émettre les signaux sonores prescrits par la règle 34*d*).

(ii) La présente règle ne saurait dispenser le navire qui rattrape de l'obligation de se conformer aux dispositions de la règle 13.

f) Un navire qui s'approche d'un coude ou d'un endroit situé dans un chenal étroit ou une voie d'accès où d'autres navires peuvent être cachés par la présence d'obstacles doit naviguer dans cette zone avec une prudence et une vigilance particulières et faire entendre le signal approprié prescrit par la règle 34*e*).

g) Tout navire doit, si les circonstances le permettent, éviter de mouiller dans un chenal étroit.

Chenaux étroits—Modifications canadiennes

h) Nonobstant l'alinéa *d*), dans les eaux du Bassin des Grands lacs, un navire qui ne peut naviguer en toute sécurité qu'à l'intérieur d'un chenal étroit ou d'une voie d'accès doit, si un navire en train de traverser ce chenal ou cette voie d'accès gêne son passage, utiliser les signaux sonores prescrits à la règle 34*d*), s'il doute des intentions du navire qui traverse le chenal ou la voie d'accès.

i) Nonobstant l'alinéa *e*), dans un chenal étroit ou une voie d'accès du Bassin des Grands lacs, un navire doit faire connaître son intention de dépasser ou donner son accord pour être dépassé, en émettant les signaux sonores au sifflet prescrits à la règle 34*j*).

j) Dans les eaux canadiennes d'un chenal étroit ou d'une voie d'accès, un chaland ou un navire ou objet peu visible, partiellement submergé, ne doit pas être navigué, amarré ou ancré d'une façon qui empêcherait le passage en toute sécurité d'un autre navire ou objet empruntant ces eaux.

(*k*) Notwithstanding paragraph (*a*) and Rule 14(*a*), in the Canadian waters of a narrow channel or fairway where there is a current or tidal stream and two power-driven vessels are meeting each other from opposite directions so as to involve risk of collision,

(i) the vessel proceeding with the current or tidal stream shall be the stand-on vessel and shall propose the place of passage and shall indicate the side on which she intends to pass by sounding the appropriate signal prescribed in Rule 34(*a*) or (*g*),

(ii) the vessel proceeding against the current or tidal stream shall keep out of the way of the vessel proceeding with the current or tidal stream and shall hold as necessary to permit safe passing,

(iii) the vessel proceeding against the current or tidal stream shall promptly reply to the signal referred to in subparagraph (i) with the same signal, if she is in agreement, and with the sound signal prescribed in Rule 34(*d*), if she is in doubt.

RULE 14

Head-on Situation

(*a*) When two power-driven vessels are meeting on reciprocal or nearly reciprocal courses so as to involve risk of collision, each shall alter her course to starboard so that each shall pass on the port side of the other.

(*b*) Such a situation shall be deemed to exist when a vessel sees the other ahead or nearly ahead and by night she could see the masthead lights of the other in a line or nearly in a line and/or both sidelights and by day she observes the corresponding aspect of the other vessel.

(*c*) When a vessel is in any doubt as to whether such a situation exists she shall assume that it does exist and act accordingly.

RULE 34

Manoeuvring and Warning Signals — International

(*a*) When vessels are in sight of one another, a power-driven vessel underway, when manoeuvring as authorized or required by these Rules, shall indicate that manoeuvre by the following signals on her whistle:

– one short blast to mean "I am altering my course to starboard",

two short blasts to mean "I am altering my course to port",

– three short blasts to mean "I am operating astern propulsion".

k) Nonobstant l'alinéa *a*) et la règle 14*a*), lorsqu'il y a un courant de marée ou autre courant dans les eaux canadiennes d'un chenal étroit ou d'une voie d'accès où deux navires à propulsion mécanique naviguant en sens inverse se rencontrent de telle sorte qu'il y a risque d'abordage:

(i) le navire descendant le courant est le navire privilégié et il doit indiquer le lieu de passage et le côté sur lequel il entend passer en émettant le signal approprié prescrit à la règle 34*a*) ou *g*),

(ii) le navire remontant le courant doit s'écarter du passage du navire descendant le courant et ralentir au besoin de façon à permettre un passage en toute sécurité;

(iii) le navire remontant le courant doit promptement répondre à l'autre navire en émettant le signal visé au sous-alinéa (i) s'il est d'accord, et en émettant le signal de danger prescrit à la règle 34*d*) s'il a des doutes.

RÈGLE 14

Navires qui font des routes directement opposées

a) Lorsque deux navires à propulsion mécanique font des routes directement opposées ou à peu près opposées de telle sorte qu'il existe un risque d'abordage, chacun d'eux doit venir sur tribord pour passer par bâbord l'un de l'autre.

b) On doit considérer qu'une telle situation existe lorsqu'un navire en voit un autre devant lui ou pratiquement devant lui, de sorte que, de nuit, il verrait les feux de mât de l'autre navire, l'un par l'autre ou presque et/ou ses deux feux de côté et que, de jour, il verrait l'autre navire sous un angle correspondant.

c) Lorsqu'un navire ne peut déterminer avec certitude si une telle situation existe, il doit considérer qu'elle existe effectivement et manœuvrer en conséquence.

RÈGLE 34

Signaux de manœuvre et signaux d'avertissement — International

a) Lorsque des navires sont en vue les uns des autres, un navire à propulsion mécanique faisant route doit, lorsqu'il effectue des manœuvres autorisées ou prescrites par les présentes règles, indiquer ces manœuvres par les signaux suivants, émis au sifflet:

– un son bref pour dire: «Je viens sur tribord»;

deux sons brefs pour dire: «Je viens sur bâbord»;

– trois sons brefs pour dire: «Je bats en arrière».

(*b*) Any vessel may supplement the whistle signals prescribed in paragraph (*a*) of this Rule by light signals, repeated as appropriate, whilst the manoeuvre is being carried out:

(i) these light signals shall have the following significance:

—one flash to mean "I am altering my course to starboard",

two flashes to mean "I am altering my course to port",

three flashes to mean "I am operating astern propulsion".

(ii) the duration of each flash shall be about one second, the interval between flashes shall be about one second, and the interval between successive signals shall be not less than 10 seconds,

(iii) the light used for this signal shall, if fitted, be an all-round white light, visible at a minimum range of 5 miles, and shall comply with the provisions of Annex I.

(*c*) When in sight of one another in a narrow channel or fairway:

(i) a vessel intending to overtake another shall in compliance with Rule 9(*e*)(i) indicate her intention by the following signals on her whistle:

—two prolonged blasts followed by one short blast to mean "I intend to overtake you on your starboard side",

—two prolonged blasts followed by two short blasts to mean "I intend to overtake you on your port side",

(ii) the vessel about to be overtaken when acting in accordance with Rule 9(*e*)(i) shall indicate her agreement by the following signal on her whistle;

—one prolonged blast, one short, one prolonged and one short blast, in that order.

(*d*) When vessels in sight of one another are approaching each other and from any cause either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision, the vessel in doubt shall immediately indicate such doubt by giving at least five short and rapid blasts on the whistle. Such signal may be supplemented by a light signal of at least five short and rapid flashes.

(*e*) A vessel nearing a bend or an area of a channel or fairway where other vessels may be obscured by an intervening obstruction shall sound one prolonged blast. Such signal shall be answered with a prolonged blast by any approaching vessel that may be within hearing around the bend or behind the intervening obstruction.

(*f*) If whistles are fitted on a vessel at a distance apart of more than 100 metres, one whistle only shall be used for giving manoeuvring and warning signals.

b) Tous les navires peuvent compléter les signaux au sifflet prescrits au paragraphe *a*) de la présente règle par des signaux lumineux répétés, selon les besoins, pendant toute la durée de la manœuvre:

(i) ces signaux lumineux ont la signification suivante:

—un éclat pour dire: «Je viens sur tribord»,

deux éclats pour dire: «Je viens sur bâbord»,

trois éclats pour dire: «Je bats en arrière»;

(ii) chaque éclat doit durer une seconde environ, l'intervalle entre les éclats doit être d'une seconde environ et l'intervalle entre les signaux successifs doit être de 10 secondes au moins;

(iii) le feu utilisé pour ce signal doit, s'il existe, être un feu blanc visible sur tout l'horizon à une distance de 5 milles au moins et doit être conforme aux dispositions de l'appendice I.

c) Lorsqu'ils sont en vue l'un de l'autre dans un chenal étroit ou une voie d'accès:

(i) un navire qui entend en rattraper un autre doit conformément aux dispositions de la règle 9*e*)(i), indiquer son intention en émettant au sifflet les signaux suivants:

—deux sons prolongés suivis d'un son bref pour dire: «Je compte vous rattraper sur tribord»,

—deux sons prolongés suivis de deux sons brefs pour dire: «Je compte vous rattraper sur bâbord»;

(ii) le navire qui est sur le point d'être rattrapé doit, en manœuvrant conformément aux dispositions de la règle 9*e*)(i), indiquer son accord en émettant au sifflet le signal suivant:

—un son prolongé, un son bref, un son prolongé et un son bref, émis dans cet ordre.

d) Lorsque deux navires en vue l'un de l'autre s'approchent l'un de l'autre et que, pour une raison quelconque, l'un d'eux ne comprend pas les intentions ou les manœuvres de l'autre, ou se demande si l'autre navire prend les mesures suffisantes pour éviter l'abordage, le navire qui a des doutes les exprime immédiatement en émettant au sifflet une série rapide d'au moins cinq sons brefs. Ce signal peut être complété par un signal lumineux d'au moins cinq éclats brefs et rapides.

e) Un navire s'approchant d'un coude ou d'une partie d'un chenal ou d'une voie d'accès où d'autres navires peuvent être cachés par un obstacle doit faire entendre un son prolongé. Tout navire venant dans sa direction qui entend le signal de l'autre côté du coude ou derrière l'obstacle doit répondre à ce signal en faisant entendre un son prolongé.

f) Lorsque des sifflets sont installés à bord d'un navire à une distance de plus de 100 mètres les uns des autres, on ne doit utiliser qu'un seul sifflet pour émettre des signaux de manœuvre et des signaux avertisseurs.

(*g*) Notwithstanding paragraph (*a*), in the waters of the Great Lakes Basin, when power-driven vessels are in sight of one another and meeting or crossing at a distance within half a mile of each other, each vessel underway, when manoeuvring as authorized or required by these Rules

(i) shall indicate that manoeuvre by the following signals on her whistle:

—one short blast to mean "I intend to leave you on my port side",

—two short blasts to mean "I intend to leave you on my starboard side", and

—three short blasts to mean "I am operating astern propulsion", and

(ii) shall, upon hearing the one or two blast signal, referred to in subparagraph (i), of the other vessel indicate her agreement by sounding the same whistle signal and taking the steps necessary to effect a safe passing. If, however, for any cause, a vessel on hearing a one or two blast signal referred to in subparagraph (i) doubts the safety of the proposed manoeuvre, she shall sound the signal specified in paragraph (*d*) and each vessel shall take appropriate precautionary action until a safe passing agreement is made.

(*h*) Notwithstanding paragraph (*b*), in the waters of the Great Lakes Basin, a vessel may supplement the whistle signals prescribed in paragraph (*g*) by light signals

(i) that have the following significance:

—one flash to mean "I intend to leave you on my port side",

—two flashes to mean "I intend to leave you on my starboard side",

—three flashes to mean "I am operating astern propulsion", and

(ii) the duration of which shall be about one second for each flash.

(*i*) The light used for a signal referred to in paragraph (*h*), shall, if fitted, be one all-round white light, visible at a minimum range of 2 miles, synchronized with the whistle signal referred to in paragraph (*h*), and shall comply with section 12 of Annex I.

(*j*) Notwithstanding paragraph (*c*), in the waters of the Great Lakes Basin, when power-driven vessels are in sight of one another in a narrow channel or fairway,

(i) the vessel intending to overtake another shall, in compliance with Rule 9(*i*), indicate her intention by the following signals on her whistle:

—one short blast to mean "I intend to overtake you on your starboard side",

—two short blasts to mean "I intend to overtake you on your port side",

(ii) the vessel about to be overtaken when acting in accordance with Rule 9(*i*) shall, if in agreement, sound the same signal as given by the other vessel. If in doubt, she shall sound the signal prescribed in paragraph (*d*).

(*k*) In the Canadian waters of a roadstead, harbour, river, lake or inland waterway, a power-driven vessel that is leaving a dock or berth shall give a signal of one prolonged blast.

g) Nonobstant l'alinéa *a*), dans les eaux du Bassin des Grands lacs, lorsque des navires à propulsion mécanique sont en vue l'un de l'autre, et se rencontrent ou se croisent à une distance inférieure à un demi-mille, chaque navire faisant route doit, lorsqu'il effectue des manœuvres autorisées ou exigées par les présentes règles

(i) indiquer la manœuvre par les signaux suivants émis au sifflet:

– un son bref pour dire: «J'ai l'intention de vous passer sur mon bâbord»,

—deux sons brefs pour dire: «J'ai l'intention de vous passer sur mon tribord», et

—trois sons brefs pour dire: «Je bats en arrière»; et

(ii) lorsqu'il entend le signal comportant un ou deux sons brefs, visés au sous-alinéa (i), de l'autre navire, s'il est d'accord, émettre le même signal au sifflet et prendre les mesures nécessaires pour assurer un passage en toute sécurité. Si, toutefois, pour une raison quelconque, le navire, lorsqu'il entend le ou les deux sons brefs visés au sous-alinéa (i), doute quant à la sécurité de la manœuvre proposée, il doit émettre le signal spécifié à l'alinéa *d*) et chaque navire prendra les mesures de précaution nécessaires jusqu'à l'obtention d'un accord de passage en toute sécurité.

h) Nonobstant l'alinéa *b*), dans les eaux du Bassin des Grands lacs, un navire peut compléter les signaux au sifflet prescrits à l'alinéa *g*) par des signaux lumineux

(i) qui ont la signification suivante:

—un éclat pour dire: «J'ai l'intention de vous passer sur mon bâbord»,

—deux éclats pour dire: «J'ai l'intention de vous passer sur mon tribord»,

— trois éclats pour dire: «Je bats en arrière»; et

(ii) dont la durée est d'environ une seconde par signal.

i) Le feu utilisé pour un signal visé à l'alinéa *h*), doit, s'il est présent, être un feu blanc visible sur tout l'horizon, à une portée minimum de 2 milles, synchronisé avec le signal du sifflet visé à l'alinéa *h*), et doit se conformer aux dispositions de l'article 12 de l'appendice I.

j) Nonobstant l'alinéa *c*), dans les eaux du Bassin des Grands lacs, lorsque des navires à propulsion mécanique sont en vue l'un de l'autre dans un chenal étroit ou une voie d'accès,

(i) le navire qui entend en rattraper un autre doit, conformément à la règle 9*i*), indiquer son intention en émettant au sifflet les signaux suivants:

—un son bref pour dire: «Je compte vous rattraper sur tribord»,

—deux sons brefs pour dire: «Je compte vous rattraper sur bâbord»;

(ii) le navire qui est sur le point d'être rattrapé doit, en manœuvrant conformément à la règle 9*i*), indiquer son accord en émettant le même signal. En cas de doute, il doit émettre le signal prescrit à l'alinéa *d*).

k) Dans les eaux canadiennes d'une rade, d'un port, d'un cours d'eau, d'un lac ou d'une voie navigable intérieure, lorsqu'un navire à propulsion mécanique quitte un quai ou un poste, il doit émettre un signal consistant en un son prolongé.

(*l*) Notwithstanding this Rule and Rule 9, in the Canadian waters of a roadstead, harbour, river, lake or inland waterway, a vessel may use a bridge-to-bridge radiotelephone instead of the prescribed whistle signals to reach agreement in a meeting, crossing or overtaking situation. If agreement is not reached, then whistle signals shall be exchanged in a timely manner and shall prevail.

RULE 35

Sound Signals in Restricted Visibility – International

In or near an area of restricted visibility, whether by day or night, the signals prescribed in this Rule shall be used as follows:

Sound Signals in Restricted Visibility—Canadian Modification

(*k*) Notwithstanding paragraph (*i*), in the Canadian waters of a roadstead, harbour, river, lake or inland waterway, a vessel that is

(i) less than 12 metres in length,

(ii) built or converted for the purpose of pushing or pulling any floating object, and

(iii) not located within a recognized mooring, storage or booming area

shall sound the signals prescribed for a vessel of 12 metres or more in length.

l) Nonobstant la présente règle et la règle 9, dans les eaux canadiennes d'une rade, d'un port, d'un cours d'eau, d'un lac ou d'une voie navigable intérieure, un navire peut faire usage du radiotéléphone entre passerelles en remplacement des signaux au sifflet prescrits, pour assurer un accord quant à la rencontre, au croisement ou au rattrapage. Si un accord n'est pas possible de cette manière, les signaux au sifflet requis doivent être émis de façon ordonnée et doivent prévaloir.

RÈGLE 35

Signaux sonores par visibilité réduite – International

Tant de jour que de nuit, à l'intérieur ou à proximité d'une zone où la visibilité est réduite, les signaux prescrits par la présente règle doivent être utilisés comme suit:

Signaux sonores par visibilité réduite—Modification canadienne

k) Nonobstant l'alinéa *i*), dans les eaux canadiennes d'une rade, d'un port, d'un cours d'eau, d'un lac ou d'une voie navigable intérieure, un navire

(i) de moins de 12 mètres de longueur,

(ii) construit ou converti en vue de pousser ou de tirer un objet flottant, et

(iii) ne se trouvant pas dans une aire connue de mouillage, d'entreposage ou de flottage,

doit émettre les signaux sonores prescrits pour un navire de 12 mètres ou plus de longueur.